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Landslide susceptibility mapping: Effect of spatial resolution towards the prediction of landslide prone area in a tropical catchment (Article)

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Abstract

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Landslide has become a common problem especially in tropical countries such as in Malaysia. This study was carried out in Fraser Hill Catchment using a GIS based deterministic slope stability analysis model, that combine infinite slope stability and steady state hydrology assumptions to quantify the stability called SINMAP. The model requires some inputs. Historical landslide inventory for the catchment were obtained from interpretation of multispectral SPOT 5 image and Global Positioning Survey (GPS) survey. Topographic maps at scale of 1:50,000 were used to construct Digital Elevation Model (DEM). Soil strength parameters and hydrologic parameters were gathered from in situ test as well as previous records. The purposes of this study were to map the landslide susceptibility of Fraser Hill Catchment and to test the usage of different DEM spatial resolution towards the accuracy of the model. Landslide susceptibility map for the study area was produced as the output of this model. The result will be compared with the actual location of slope failure that occur within the catchment to assess the model performance. Results showed that, for this catchment, SINMAP gives good results in predicting the landslide with 68% of the current landslide inventory fall within unstable class as their calculation of Stability Index (SI) are less than 1. Results from the spatial resolution analysis showed that 20 and 30 meter resolution gave optimum result compared to others.

SciVal Topic Prominence

Topic: Landslide | Landslides | Landslide locations

Prominence percentile: 99.649

Author keywords

Digital elevation model (DEM) | Geographic information system (GIS) | Landslide susceptibility map | Shallow landslide | Spatial resolution

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